Wisconsin Commercial Buildings Plan Review Fire Sprinkler Submittal Checklists

NFPA 13 and 13R Installation of Sprinkler Systems

1. A current waterflow test.
2. An adequately sized air compressor if required. NFPA 13 4-2.6.2
3. Remote area location.
4. Explanation and code reference for any adjustments in the design criteria.
5. Relief valve or expansion tank shown for gridded systems. NFPA 13 4-1.2
6. Method for testing alarms. NFPA 13 5-15.4
7. Working plans shall be drawn to an indicated scale, on sheets of uniform size, with a plan of each floor, and shall show those items from the following list that pertain to the design of the system.

(1) Name of owner and occupant.
(2) Location, including street address.
(3) Point of compass.
(4) Full height cross section, or schematic diagram, including structural member information if required for clarity and including ceiling construction and method of protection for nonmetallic piping.
(5) Location of partitions.
(6) Location of fire walls.
(7) Occupancy classification of each area or room.
(8) Location and size of concealed spaces, closets, attics, and bathrooms.
(9) Any small enclosures in which no sprinklers are to be installed.
(10) Size of city main in street and whether dead end or circulating; if dead end, direction and distance to nearest circulating main; and city main test results and system elevation relative to test hydrant (see A-9-2.1).
(11) Other sources of water supply, with pressure or elevation.
(12) Make, type, model, and nominal K-factor of sprinklers.
(13) Temperature rating and location of high-temperature sprinklers.
(14) Total area protected by each system on each floor.
(15) Number of sprinklers on each riser per floor.
(16) Total number of sprinklers on each dry pipe system, preaction system, combined dry pipe-preaction system, or deluge system.
(17) Approximate capacity in gallons of each dry pipe system.
(18) Pipe type and schedule of wall thickness.
(19) Nominal pipe size and cutting lengths of pipe (or center-to-center dimensions). Where typical branch lines prevail, it shall be necessary to size only one typical line.
(20) Location and size of riser nipples.
(21) Type of fittings and joints and location of all welds and bends. The contractor shall specify on drawing any sections to be shop welded and the type of fittings or formations to be used.
(22) Type and locations of hangers, sleeves, braces, and methods of securing sprinklers when applicable.
(23) All control valves, check valves, drain pipes, and test connections.
(24) Make, type, model, and size of alarm or dry pipe valve.
(25) Make, type, model, and size of preaction or deluge valve.
(26) Kind and location of alarm bells.
(27) Size and location of standpipe risers, hose outlets, hand hose, monitor nozzles, and related equipment.

(28) Private fire service main sizes, lengths, locations, weights, materials, point of connection to city main; the sizes, types and locations of valves, valve indicators, regulators, meters, and valve pits; and the depth that the top of the pipe is laid below grade.
(29) Piping provisions for flushing.
(30) Where the equipment is to be installed as an addition to an existing system, enough of the existing system indicated on the plans to make all conditions clear.
(31) For hydraulically designed systems, the information on the hydraulic data nameplate.
(32) A graphic representation of the scale used on all plans.
(33) Name and address of contractor.
(34) Hydraulic reference points shown on the plan that correspond with comparable reference points on the hydraulic calculation sheets.
(35) The minimum rate of water application (density), the design area of water application, in-rack sprinkler demand, and the water required for hose streams both inside and outside.
(36) The total quantity of water and the pressure required noted at a common reference point for each system.
(37) Relative elevations of sprinklers, junction points, and supply or reference points.
(38) If room design method is used, all unprotected wall openings throughout the floor protected.
(39) Calculation of loads for sizing and details of sway bracing.
(40) The setting for pressure-reducing valves.
(41) Information about backflow preventers (manufacturer, size, type).
(42) Information about antifreeze solution used (type and amount).
(43) Size and location of hydrants, showing size and number of outlets and if outlets are to be equipped with independent gate valves. Whether hose houses and equipment are to be provided, and by whom, shall be indicated. Static and residual hydrants that were used in flow tests shall be shown.
(44) Size, location, and piping arrangement of fire department connections.

8. Water flow information – static, residual and flow. NFPA 13 8-2.1
The following information shall be included:
(1) Location and elevation of static and residual test gauge with relation to the riser reference point
(2) Flow location
(3) Static pressure, psi (bar)
(4) Residual pressure, psi (bar)
(5) Flow, gpm (L/min)
(6) Date
(7) Time
(8) Test conducted by or information supplied by
(9) Other sources of water supply, with pressure or elevation

Hydraulic Calculation Checklist

1. Nameandand address of project. NFPA 13 8-3.2(2), (3) and (4)
2. Area calculated identified.
3. Description of hazard. NFPA 13 8-3.2(5)
4. Name and address of contractor. NFPA 13 8-3.2(6)
5. Stamped and signed by design professional. Comm 50.155 (1)(b)1 and 2
6. Design area. NFPA 13 8-3.2 (8)a
7. Minimum rate of water application. NFPA 13 8-3.2(8)b
8. Area per sprinkler. NFPA 13 8-3.2(8)c
9. Total water and pressure requirement. NFPA 13 8-3.2(9)

10. Equivalent k factors for drops, sprigs, etc. NFPA 13 8-3.3(16)
11. Hose allowances added. NFPA 13 8-3.2(9)
12. Rack sprinkler allowance added. NFPA 13 8-3.2(10)
13. Water curtain allowance added. NFPA 13 8-3.2(9)
14. Equivalent feet or friction loss for dry pipe valve, preaction valve and deluge valve. NFPA 13 8-3.3(7)
15. Equivalent feet or friction loss for cross connection device. NFPA 13 8-3.3(7)
16. Correct C factor for system and pipe type. NFPA 13 8-4.4.5
17. Pipe sizes and lengths correspond to plan. NFPA 13 8-3.3(5) and (6)
18. Correct number of fittings and equivalent lengths included. NFPA 13 8-3.3(7)
19. Flow diagram included with grid calculations NFPA 13 8-3.3(15)
20. Calculations for grids indicate system was peaked. NFPA 13 8-4.4.2
21. Pipe elevations. NFPA 13 8-3.3(11)
22. Calculations include all piping to the water supply source used. NFPA 13 8-2.1
23. Correct minimum operating pressure for all sprinklers. NFPA 13 8-4.4.8
24. Where residential sprinklers are used, a 4 sprinkler calculation and a 1 sprinkler calculation must be submitted. NFPA 13 7-9.2.2
25. Calculations and plans use appropriate hydraulic symbols per NFPA 13 Table 1-5.

Symbol or Abbreviation	**Item**
p	Pressure in psi
gpm	U.S. gallons per minute
q	Flow increment in gpm to be added at a specific location
Q	Summation of flow in gpm at a specific location
Pt	Total pressure in psi at a point in a pipe
Pf	Pressure loss due to friction between points indicated in location column
Pe	Pressure due to elevation difference between indicated points. This can be a plus value or a minus value. If minus, the (-) shall be used; if plus, no sign need be indicated.
Pv	Velocity pressure in psi at a point in a pipe
Pn	Normal pressure in psi at a point in a pipe
E	90° ell
EE	45° ell
Lt.E	Long-turn elbow
Cr	Cross
T	Tee-flow turned 90°
GV	Gate valve
BV	Butterfly (wafer) check valve
Del V	Deluge valve
ALV	Alarm valve
DPV	Dry pipe valve
CV	Swing check valve
WCV	Butterfly (wafer) check valve
St	Strainer
psi	Pounds per square inch
v	Velocity of water in pipe in feet per second

EQUIPMENT AND MATERIAL SUBMITTALS

1. Sprinklers
2. Cross connection control device
3. Dry pipe valve
4. Preaction valve
5. Deluge valve
6. Alarm check valve
7. Fire pump
8. Fire pump controller
9. Pressure tank
10. Pressure reducing valve
11. Foam equipment
12. Detection equip for preaction and deluge system

NFPA 11 LOW-EXPANSION FOAM

1. Physical details of the hazard: including the location, arrangement and hazardous materials involved. NFPA 11 4-4.1 (f)
2. Water requirements. NFPA 11 4-4.1 (d)
3. The type of foam concentrate used. NFPA 11 4-4.1 (b)
4. The consumption rate of the foam concentrate. NFPA 11 2-3.2.5.1, and 4-4.1 (b)
5. The required solution application rate and discharge time. NFPA 11 4-4.1 (c)
6. The method of foam proportioning. NFPA 11 2-5
7. Pipe and fittings per NFPA 11 2-7.
8. The method of system control including schematic wiring diagrams if required. NFPA 11 2-9 and 4-4.1(i)
9. Supplemental protection if provided. NFPA 11 3-2.1.1
10. Calculations specifying required amount of concentrate. NFPA 11 4-4.1 (e)
11. Hydraulic calculations. NFPA 11 4-4.1 (f) and NFPA 13 Chapter 8
12. Identify and state capacity of all equipment and devices. NFPA 11 4-4.1 (g)
13. Location of all piping, detection devices, operating devices, generators, discharge outlets and auxiliary equipment. NFPA 11 4-4.1 (h)
14. Complete plans and detailed data (specifications) describing pumps, drivers, controllers, power supply, fittings, suction and discharge connections and suction conditions, shall be submitted for approval. NFPA 11 4-4.2

NFPA 11A MEDIUM- AND HIGH-EXPANSION FOAM

1. The system specifications shall be part of the submittal. NFPA 11A 1-8.1/1-8.1.3
2. A detailed description of specific materials involved. NFPA 11A 1-8.2.2
3. The location and arrangement of the hazard. NFPA 11A 1-8.2.2
4. The required amount of foam concentrate. NFPA 11A 1-8.2.2
5. Water requirements. NFPA 11A 1-8.2.2
6. Hydraulic calculations. NFPA 11A 1-8.2.2 and 1-12..2.1 and NFPA 13 Chap 8
7. The location and function of detection devices, operating devices, auxiliary equipment, including standby power, and electrical circuitry, if used. NFPA 11A 1-8.2.2
8. The size and location of foam generators. NFPA 11A 1-8.2.2
9. The foam requirements shall be detailed on the plans. NFPA 11A 2-3

NFPA 12 CARBON DIOXIDE EXTINGUISHING SYSTEMS

1. The plans shall be drawn to an indicated scale or be suitably dimensioned. NFPA 12 1-7.2.1
2. Key plan showing location of the system.
3. Point of compass.
4. Materials involved in the protected hazards. NFPA 12 1-7.2.2
5. Location of the hazards. NFPA 12 1-7.2.2
6. Enclosure or limits and isolation of the hazards. NFPA 12 1-7.2.2
7. Surrounding area that could affect the protected hazards. NFPA 12 1-7.2.2
8. Information and calculations on the amount of carbon dioxide. NFPA 12 1-7.2.3 (1)
9. Location and flow rate of each nozzle including equivalent orifice area. NFPA 12 1-7.2.3 (2)
10. Location, size and equivalent lengths of pipe, fittings and hose. NFPA 12 1-7.2.3 (3)
11. Location and size of the carbon dioxide storage facility. NFPA 12 1-7.2.3 (4)
12. Location and function of detection devices, operating devices, auxiliary equipment and electrical circuitry. NFPA 12 1-7.2.3

NFPA 14 STANDPIPES AND HOSE SYSTEMS

1. All applicable items from NFPA 14 6-1
2. Class of standpipe on plans. NFPA 14 3-3
3. Type of standpipe (wet, dry, etc). NFPA 14 3-2
4. Location of waterflow alarms. NFPA 14 3-7
5. Location of piping. NFPA 4-1.2.2
6. Correctly located fire department connection NFPA 4-3.3
7. Hose connections located per NFPA 14 5-3.
8. Correct number of standpipes. NFPA 5-4
9. Correct interconnection of multiple standpipes. NFPA 14 5-5
10. Correct pipe sizing. NFPA 14 5-6
11. Minimum pressures as per NFPA 14 5-7
12. Pressure regulating devices provided for outlets with high pressures. NFPA 14 5-8
13. Minimum flow rates achieved. NFPA 14 5-9
14. Drain and test riser appropriately sized. NFPA 5-11
15. Correct number of fire department connections per NFPA 14 5-12
16. A complete set of hydraulic calculations. NFPA 14 6-2
17. Plans to show an approved water supply capable of supplying the system demand. NFPA 14 7.0
18. Current water supply information. NFPA 14 8-2.2

NFPA 15 WATER SPRAY FIXED SYSTEMS FOR FIRE PROTECTION

1. All applicable items from NFPA 15 5-2.1.1.
2. Hydraulic calculations. NFPA 15 5-1.1 and 5.3

NFPA 16 FOAM-WATER SPRINKLER AND FOAM-WATER SPRAY SYSTEMS

1. Indicate the quantity of foam concentrate to be stored including the quantity in reserve, the concentrate designation and the minimum anticipated temperature of the concentrate at the point of proportioning. NFPA 16 4-2.1
2. List the specific tests to be conducted. NFPA 16 4-2.2
3. The type of foam concentrate used. NFPA 16 4-4.1
4. The method of foam proportioning. NFPA 16 2-4
5. Pump submittal. NFPA 16 4-2.4
6. The method of system control including schematic wiring diagrams if required. NFPA 16 4-3.8
7. The location of draft curtains, detection zones and drainage area separations if the impact the performance of the foam-water system. NFPA 16 4-2.5
8. The location and description of hazards to be protected.. NFPA 16 4-2.6
9. Hydraulic calculations. NFPA 16 4-4 and NFPA 13 Chapter 8
10. The required discharge density. NFPA 16 4-3.2

NFPA 17 DRY CHEMICAL EXTINGUISHING SYSTEMS

1. Plans shall be submitted for all engineered and pre-engineered systems. NFPA 17 8-1.1
2. Manufacturer's equipment specifications shall be submitted for all engineered systems. NFPA 17 8-1.2.1
3. Engineered systems shall be drawn to an indicated scale or be suitable dimensioned. NFPA 17 8-2.1
4. Plans shall contain sufficient detail to evaluate the hazard and to evaluate the effectiveness of the system. NFPA 17 8-2.2
5. Details shall be provided on the materials involved, the location and arrangement and the exposure to the hazard. NFPA 17 8-2.2
6. Plans shall show the size, length and arrangement of connected piping, or piping and hose. NFPA 17 8-2.3
7. A description and the location of all nozzles shall be shown. NFPA 17 8-2.3
8. Calculations and flow rates for the nozzles shall be shown. NFPA 17 8-2.3
9. Information indicating the location and function of detection devices, operating devices, auxiliary equipment and electrical circuitry, if used. NFPA 17 8-2.3
10. All apparatus and devices shall be clearly noted on the plans. NFPA 17 8-2.3

NFPA 17A WET CHEMICAL EXTINGUISHING SYSTEMS

1. The manufacturers installation and maintenance manual shall be submitted.
2. Plans shall be submitted for all engineered and pre-engineered systems. NFPA 17A 4-2 and 4-2.4
3. Manufacturer's equipment specifications shall be submitted for all engineered systems. NFPA 17A 4-1
4. Engineered systems shall be drawn to an indicated scale or be suitable dimensioned. NFPA 17A 4-2.1

5. Plans shall contain sufficient detail to evaluate the hazard and to evaluate the effectiveness of the system. NFPA 17A 4-2.2
6. Details shall be provided on the materials involved, the location and arrangement and the exposure to the hazard. NFPA 17A 4-1 (e)
7. Plans shall show the size, length and arrangement of connected piping, or piping and hose. NFPA 17A 4-2.3
8. A description and the location of all nozzles shall be shown. NFPA 17A 4-2.3
9. Calculations and flow rates for the nozzles shall be shown.
10. Information shall be submitted pertaining to the location and function of detection devices, operating devices, auxiliary equipment and electrical circuitry, if used. NFPA 17A 4-2.3
11. All apparatus and devices shall be clearly noted on the plans.

NFPA 20 STATIONARY PUMPS FOR FIRE PROTECTION

1. Correct fire rating for pump room. NFPA 20 2-7
2. Rated pump capacity. NFPA 20 2-3
3. All equipment clearly noted.
4. Relief valve if required. NFPA 20 2-13
5. Bypass piping if required. NFPA 20 2-9.4
6. A method for testing the fire pump. NFPA 20 2-14
7. Pump shaft rotation. NFPA 20 2-17
8. Jockey pump and associated valves and piping. NFPA 20 2-19
9. Backflow preventer properly piped. NFPA 20 2-21
10. Fire pump submittal and certified shop test curve. NFPA 20 1-4.3 and 1-7
11. Fire pump and jockey pump controller locations.
12. Fire pump and jockey pump controller piping. NFPA 20 7-5.2
13. Power supply arrangement shall be shown. NFPA 20 6-3.2

NFPA 22 WATER TANKS FOR PRIVATE FIRE PROTECTION

1. The capacity and elevation of the tank. NFPA 22 1-5
2. The tank location. NFPA 22 1-6
3. The material the tank is constructed from. NFPA 22 1-7
4. Information on the tank foundation if applicable. NFPA 22 1-6.4 and CHP 9
5. The tank dead load. NFPA 22 2-3.1
6. The tank live load. NFPA 22 2-3.2
7. The wind load on the tank if applicable. NFPA 22 2-3.3
8. The tank specification submittal.
9. The air pressure and water level of pressure tanks. NFPA 5-1.3
10. The method of freeze protection if applicable. NFPA 22 CHP 13
11. Air compressor information for pressure tanks. NFPA 22 5-2.10
12. The method for tank filling. NFPA 22 5-2.3 and 11-4
13. Outlet piping and valves. NFPA 22 11-2

NFPA 24 PRIVATE FIRE SERVICE MAINS AND THEIR APPURTENANCES

1. The size and location of all water supplies. NFPA 24 1-4.2 (a)
2. The size and location of all new pipe. NFPA 24 1-4.2 (b)
3. The type and class of new pipe. NFPA 24 1-4.2 (b)

4. The depth of bury of pipe. NFPA 24 1-4.2 (b)
5. The size, type and location of valves. NFPA 24 1-4.2 (c)
6. The size, type and location of meters and backflow preventers. NFPA 24 1-4.2 (c)
7. The size and location of hydrants, showing size and number of outlets. NFPA 24 1-4.2 (d)
8. The location of hose houses if any and the equipment in them. NFPA 24 1-4.2 (d)
9. The location of sprinkler and standpipe riser and monitor nozzles supplied by the system. NFPA 24 1-4.2 (e)
10. The location and type of fire department connection if any. NFPA 24 1-4.2 (f)
11. The location, size, construction and valves within any pits shall be shown. NFPA 24 3-4
12. The method of restraining pipe and fittings shall be shown. NFPA 24 8-6

NFPA 30 FLAMMABLE AND COMBUSTIBLE LIQUIDS CODE

1. The class of flammable and or combustible liquid involved. NFPA 30 4.8.2
2. The storage arrangement being used. NFPA 30 4.8.2
3. The type of containers being used. NFPA 30 4.8.2
4. The size of container being used. NFPA 30 4.8.2
5. The storage height. NFPA 30 4.8.2
6. The building height. NFPA 30 4.8.2
7. The table used to determine the protection criteria. NFPA 30 4.8.2
8. The ceiling sprinkler spacing. NFPA 30 4.8.2.2

NFPA 30B MANUFACTURE AND STORAGE OF AEROSOL PRODUCTS

1. The classification of the aerosol product. NFPA 30B 1-7
2. The storage arrangement being used. NFPA 30B 4-3.2
3. The storage height. NFPA 30B 4-3.2.11
4. The building height. NFPA 30B 4-3.2.11
5. The clearance between storage and sprinkler deflector. NFPA 30B 4-3.2.11
6. The table used to determine the protection criteria.

NFPA 45 FIRE PROTECTION FOR LABORATORIES USING CHEMICALS

1. List the Laboratory Unit Fire Hazard Classification. NFPA 45 2.1

NFPA 72 NATIONAL FIRE ALARM CODE

1. Complete building floor plans showing at least the following. NFPA 72 1-6.1.1
2. Type of building construction and occupancy. NFPA 72 A-1-5.5.2.1 (5)
3. Type of fire alarm system to be provided. NFPA 72 A-1-5.5.2.1 (7)
4. Type of fire alarm-initiating devices, etc. NFPA 72 A-1-5.5.2.1 (9)
5. Intended area of coverage. NFPA 72 A-1-5.5.2.1 (10)
6. The location of all alarm equipment and wiring. NFPA 72 1-6.1.1
7. Other applicable codes, standards and other design criteria to which the system is required to comply with is indicated on the plans. NFPA 72 A-1-5.5.2.1 (4)
8. Fire department response point (s) and annunciator location shall be shown. NFPA 72 A-1-5.5.2.1 (6)

9. Complete list of detection, evacuation signaling and annunciator zones. NFPA 72 A-1-5.5.2.1 (11)
10. Calculations, for example, secondary supply and voltage drop, etc. NFPA 72 A-1-5.5.2.1 (8)
11. Complete list of fire safety control functions. NFPA 72 A-1-5.5.2.1 (12)
12. Complete sequence of operations, detailing all inputs and outputs. NFPA 72 A-1-5.5.2.1 (13)

NFPA 750 WATER MIST FIRE PROTECTION SYSTEMS

1. Working plans shall show those items from NFPA 750 8-1.2 that pertain to the design of the submitted system.
2. Hydraulic calculations per NFPA 750 8-2.
3. Detection, actuation and control systems documentation. NFPA 750 8-4

NFPA 2001 CLEAN AGENT FIRE EXTINGUISHING SYSTEMS

1. Working plans shall show those items from NFPA 2001 3-1.2.2 that pertain to the design of the submitted system.
2. Flow calculations shall be submitted per NFPA 2001 3-2.
3. Detection, actuation and control systems documentation. NFPA 2001 2-3.